



Checklist

Checklist of Invertebrates from the Racha and Khvamli Karst Massifs, Sakartvelo (Georgia)

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Abstract

The Caucasus region is recognized as a global biodiversity hotspot, hosting a remarkable diversity. Among its unique ecosystems, karst caves in western Georgia provide habitat for highly specialized invertebrate fauna. Despite the ecological significance of these cave systems, biospeleological research in the region remains limited. Based on recent studies, an updated and expanded checklist of invertebrates from the Racha and Khvamli karst massifs is provided. We report 102 species, representing 25 orders, 57 families, and 78 genera, including eight newly recorded taxa for the caves of Racha and Khvamli karst Massifs: *Globochthonius satapliaensis*, *Harpolithobius perplexus*, *H. spinipes*, *Lithobius viriatus*, *Chaetoleptophyllum flexum*, *Leucogeorgia gioi*, *Porrhomma convexum* and *Colchidoniscus kutaissianus*. Of these 102 species, 20 are troglobionts, 11 are stygobionts, 45 are troglophiles, two are stygophiles, 13 are troglonexes, six are accidental records and for five species ecological status is not defined.

Key words: South Caucasus, endemism, subterranean fauna



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Introduction

The first documented information on the cave invertebrate fauna of the Racha karst massif was provided by Birstein & Lopaschov (1940) in the paper, “Investigation of the cave fauna in the USSR in 1935–1939”. Until the 21st century, most data on cave invertebrates from the Racha massif came from Tsakhi (= Gogolati) Cave (Borutzkii 1950; Birstein 1950; Golovatch 1990), with additional records from a few other caves, such as Melia (= Nikortsminda) Cave (Golovatch 1985), Sakishore Cave, and Tsvitskala I Cave (Kobakhidze 1958). For several decades thereafter, the karst massif was relatively poorly studied, until the late 2010s, when Georgian biospeleologists began collecting new data. Barjadze et al. (2015a, 2015b) published an annotated list of the invertebrates in the caves of the Racha region (Western Georgia), reporting 73 species from 11 caves.

The Khvamli karst massif, located close to the Racha massif (both belonging to the Racha-Lechkhumi and Kvemo Svaneti region), has only recently been investigated biologically. According to the 2009 cadastre, 16 caves were documented speleologically in the Khvamli massif (Tatashidze et al. 2009), although additional caves have been discovered since then, and the number has

increased to 20. While seven species were previously recorded from four caves (Barjadze et al. 2019), this article presents 11 species from 5 caves.

Here, we present an updated checklist of the cave-dwelling invertebrates of the Racha and Khvamli karst massifs, including new records and updated distributions of previously reported species.

Material and methods

This study was conducted by reviewing the existing literature published between 1940 and 2025. Additional data were collected from caves between 2018 and 2024 using hand-collection methods. Specimens were stored in the collections of the Institute of Zoology, Ilia State University, Tbilisi, Georgia (ISUIZ) in pure ethanol.

Collected material was identified by taxonomic specialists. Specimens were sorted and identified using a UNITRON Z650HR Stereo Microscope and an Accu-Scope Exc-350 Light Microscope. A map was created using QGIS version 3.40.6. Graphs were prepared in Microsoft Excel. Ecological groups were assigned based on previous literature (Turbanov et al. 2016a, 2016b; Barjadze et al. 2019; original descriptions for all existing species and personal communications).

The photos used in the article were provided by Dragan Antić captured with Olympus Stylus Tough TG-6 digital camera.

Study Area

The study area comprises the Racha and Khvamli karst massifs (RKM and KKM respectively), located in the South Caucasus, in north-western Georgia (Tsikarishvili et al. 2010) (Fig. 1; Table 1).

The Racha karst massif lies within the Oni and Ambrolauri municipalities and includes up to 45 documented caves and chasms. The Khvamli karst massif is situated between the Tskhenistskali and Rioni river valleys, within the Tskaltubo and Tsageri municipalities. A total of 16 speleologically studied caves have been recorded there, along with a bedrock formation (Tatashidze et al. 2009).

Table 1. List of studied caves in Racha and Khvamli massifs with geographic data and recorded species numbers.

Cave	Geographic Coordinates	Elevation (m a.s.l.)	Number of species	References
Khvamli Karst massif				
Lageraia I	N42.545479, E42.686656	742	1	Antić and Makarov 2016
Tvishi	N42.525686, E42.793161	468	2	Tatashidze et al. 2009
Tvishi V	N42.528530, E42.794096	398	2	–
Verdzistava I	N42.529234, E42.792486	493	1	Tatashidze et al. 2009
Verdzistava II	N42.528723, E42.793847	461	5	Tatashidze et al. 2009
Racha Karst massif				
Dolabistavi	N42.451083, E43.177639	1202	10	Tatashidze et al. 2009
Ekis (=Eckis)	N42.540000, E42.890000	414	1	Antić and Reip 2020
Gorgoleti	N42.517570, E42.916524	599	2	Grego et al. 2020
Mghvime Gzis Piras	N42.379620, E43.040900	1198	3	Tsikarishvili and Bolashvili 2013
Kakhidze	N42.520050, E42.912390	585	7	Tatashidze et al. 2009
Kidobana	N42.434014, E43.145800	1166	17	Tatashidze et al. 2009

Cave	Geographic Coordinates	Elevation (m a.s.l.)	Number of species	References
Kvedi I	N42.556100, E43.572100	1561	2	Mumladze et al. 2023
Kvedi II	N42.556100, E43.569100	1623	4	Mumladze et al. 2023
Melia	N42.450980, E43.073470	1136	16	Tatashidze et al. 2009
Muradi	N42.395955, E42.978848	1501	1	Asanidze et al. 2017
Racha 2001	N42.398900, E42.989060	1427	1	Tatashidze et al. 2009
RAW020	N42.422690, E43.050090	1182	1	Ravanne 2022
RAW024	N42.397470, E42.993660	1393	1	Ravanne 2022
RAW025	N42.397110, E42.995770	1400	2	Ravanne 2022
Sakavria	N42.404300, E43.002900	1474	3	Ravanne 2022
Sakinule	N42.463440, E43.067410	1193	8	Tatashidze et al. 2009
Sakishore	N42.442342, E43.159486	1165	14	Tatashidze et al. 2009
Shareula I	N42.470000, E43.067778	1141	4	Tatashidze et al. 2009
Shareula II	N42.471057, E43.063830	1128	1	–
Shkmeri	N42.489233, E43.401644	1665	1	Chertoprud et al. 2023
Tsakhi	N42.522167, E42.912583	676	20	Tatashidze et al. 2009
Tsivtskala I	N42.470948, E43.064330	1166	3	Tatashidze et al. 2009
Tsivtskala II	N42.471667, E43.065000	1130	3	Tsikarishvili and Bolashvili 2013
Tskhrajvari I	N42.388253, E42.984672	1438	4	Tatashidze et al. 2009
Tskhrajvari II	N42.387569, E42.983540	1497	1	Tatashidze et al. 2009
Usholta	N42.499270, E43.386690	1817	7	Tatashidze et al. 2009

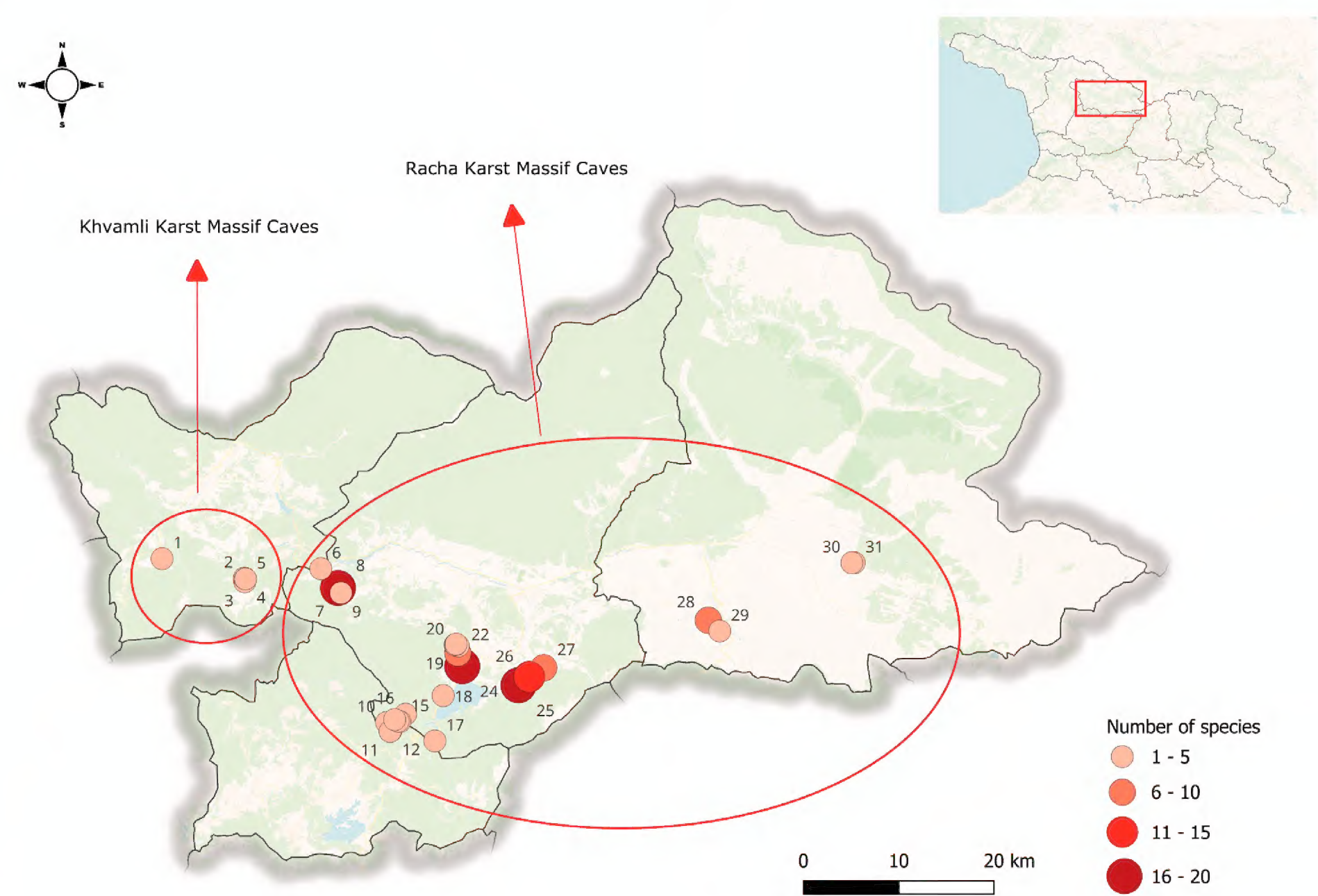


Figure 1. Species richness in caves of Racha and Khvamli karst massifs: Lagernaia I (1); Verdzistava I (2); Tvishi (3); Verdzistava II (4); Tvishi V (5); Ekis (6); Kakhidze (7); Tsakhi (8); Gorgoleti (9); Muradi (10); Tskhrajvari II (11); Tskhrajvari I (12); Racha 2001 (13) RAW024 (14); RAW025 (15); Sakavria (16); Mghvime Gzis Piras (17); RAW020 (18); Shareula II (19); Tsivtskala I (20); Tsivtskala II (21); Sakinule (22); Shareula I (23); Melia (24); Kidobana (25); Sakishore (26); Dolabistavi (27); Usholta (28); Shkmeri (29); Kvedi II (30); Kvedi I (31).

Results

The species list provided here is taxonomically arranged. For each species, the distribution within the study area (specific caves) and within Georgia (Karst massifs) is provided. The boundaries of Karst massifs follows Tatashidze et al. (2009). Ecological groups are delineated based on taxon-specific literature and our own observations.

Phylum Annelida Lamarck, 1809

Class Clitellata Michaelsen, 1919

Order Arhynchobdellida Blanchard, 1894

Family Erpobdellidae Moore, 1908

Genus *Dina* Blanchard, 1892

1. *Dina kobakhidzei* Grosser, Maghradze & Barjadze, 2025

Distribution in the study area. Tskhrajvari I Cave (Grosser et al. 2025); endmeic to RKM (Fig. 2).

Ecological group. Stygobiont (Grosser et al. 2025).

2. *Dina ratschaensis* Kobakhidze, 1958

Distribution in the study area. Sakishore and Tsivtskala I caves (Grosser et al. 2023); endmeic to RKM.

Ecological group. Stygobiont (Grosser et al. 2023).

Phylum Mollusca Linnaeus, 1758

Class Gastropoda Cuvier, 1795

Order Littorinimorpha Golikov & Starobogatov, 1975

Family Hydrobiidae Stimpson, 1865

Genus *Hausdorfenia* Grego & Mumladze, 2020

3. *Hausdorfenia pseudohauffenia* Grego & Mumladze, 2020

Distribution in the study area. Dolabistavi, Kidobana, and Sakishore caves (Grego et al. 2020); endmeic to RKM.

Ecological group. Stygobiont (Grego et al. 2020).

4. *Hausdorfenia shareula* Grego & Mumladze, 2020

Distribution in the study area. Shareula I and Tsivtskala II caves (Grego et al. 2020); endmeic to RKM.

Ecological group. Stygobiont (Grego et al. 2020).

Genus *Imeretiopsis* Grego & Mumladze, 2020

5. *Imeretiopsis gorgoleti* Grego & Mumladze 2020

Distribution in the study area. Gorgoleti Cave (Grego et al. 2020); endmeic to RKM.

Ecological group. Stygobiont (Grego et al. 2020).

Genus *Sitnikovia* Chertoprud, Palatov & Vinarski, 2020

6. *Sitnikovia ratschuli* Chertoprud, Palatov, Vinarski, 2020

Distribution in the study area. Gorgoleti and Sakishore caves (Chertoprud et al. 2020); endmeic to RKM.

Ecological group. Stygobiont (Chertoprud et al. 2020).

Genus *Tschernomorica* Vinarski & Palatov, 2019

7. *Tschernomorica kopidophora* Chertoprud, Grego & Mumladze, 2023

Distribution in the study area. Shkmeri Cave (Chertoprud et al. 2023).

Distribution in the Georgian Karst massifs. Okriba, Racha, Zemo Imereti plateau (Barjadze et al. 2019).

Ecological group. Stygophile (Chertoprud et al. 2023).

Order Stylommatophora Schmidt, 1855

Family Clausiliidae J. E. Gray, 1855

Genus *Acrotoma* O. Boettger, 1881

8. *Acrotoma baryshnikovi* I. M. Likharev & Schileyko, 2007

Distribution in the study area. Kvedi I Cave (Mumladze et al. 2023).

Distribution in the Georgian Karst massifs. Kudaro, Racha (Barjadze et al. 2019).

Ecological group. Probably a troglophile (Turbanov et al. 2016a).

Genus *Mucronaria* O. Boettger, 1877

9. *Mucronaria kartvelica* Mumladze, Grego & Szekeres, 2023

Distribution in the study area. Kvedi I and Kvedi II caves (Mumladze et al. 2023); endmeic to RKM.

Ecological group. Stygophile (Mumladze et al. 2023).

Family Oxychilidae P. Hesse, 1927 (1879)

Genus *Oxychilus* Fitzinger, 1833

10. *Oxychilus mingrelicus koutaisanus* (Mousson, 10863)

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Okriba, Racha, Sataplia-Tskaltubo, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglaxene (L. Mumladze personal communication).

Genus *Schistophallus* A. J. Wagner, 1914

11. *Schistophallus sucinacius* (O. Boettger, 1883)

Distribution in the study area. Sakishore Cave (Barjadze et al. 2019).

Ecological group. Troglaxene (L. Mumladze personal communication).

Phylum Arthropoda Gravenhorst, 1843

Class Arachnida Cuvier, 1812

Order Araneae Clerck, 1757

Family Amaurobiidae Thorell, 1869

Genus *Amaurobius* C.L. Koch, 1837

12. *Amaurobius fenestralis* (Ström, 1768)

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Trogloxene. Species of the genus *Amaurobius* often occur at the cave entrances (Mamolla et al. 2022).

Family Dysderidae C. L. Koch, 1837

Genus *Dysdera* Latreille, 1804

13. *Dysdera anatoliae* Deeleman-Reinhold, 1988

Distribution in the study area. Dolabistavi Cave (Deltshev et al. 2023).

Ecological group. Trogloxene (Deltshev et al. 2023).

Family Linyphiidae Blackwall, 1859

Genus *Porrhomma* Simon, 1884

14. *Porrhomma convexum* (Westring, 1851)

Material examined. GEORGIA • 1♂; western Georgia, Ambrolauri municipality, RAW025 Cave; 12 May 2025; leg. Sh Barjadze, E Kiria, N Modebadze, L Shavadze.

Distribution in the study area. RAW025 Cave.

Distribution in the Georgian Karst massifs. Racha, Sataplia-Tskaltubo (Deltshev et al. 2023).

Ecological group. Trogloxene (Barjadze et al. 2019).

Family Lycosidae Sundevall, 1833

Genus *Pardosa* Koch, 1847

15. *Pardosa hortensis* (Thorell, 1872)

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Accidental record (A. Seropian personal communication).

16. *Pardosa monticola* (Clerck, 1757)

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Accidental record (A. Seropian personal communication).

Family Nesticidae Simon, 1894

Genus *Aituaria* Esysunin & Efimik, 1998

17. *Aituaria borutzkyi* (Reimoser, 1930)

Material examined. GEORGIA • 1♂, 1♀; western Georgia, Ambrolauri municipality, RAW024 Cave; 12 Jun 2025; leg. Sh Barjadze, E Kiria, N Modebadze, L Shavadze. • 2 Juv; western Georgia, Ambrolauri municipality, Melia Cave; 14 Jun. 2025; leg. E Kiria, N Modebadze. • 1♀, 1 Juv.; western Georgia, Ambrolauri municipality, RAW025 Cave; 12 May 2025; leg. Sh Barjadze, E Kiria, N Modebadze, L Shavadze. • 1 Juv.; western Georgia, Ambrolauri municipality, Tskhrajvari II Cave; 25 Aug 2024; leg. E Maghradze. • 1 Juv.; western Georgia, Ambrolauri municipality, RAW020 Cave; 14 Jun 2025; leg. N Modebadze.

Distribution in the study area. Dolabistavi, Melia, RAW020, RAW024, RAW025, Sakishore, Tsahki, and Tskhrajvari II caves (Barjadze et al. 2019).

Distribution in the Georgian Karst massifs. Askhi, Odishi plain, Okriba, Racha, Sataplia-Tskaltubo, Zemo Imereti plateau (Barjadze et al. 2019).

Ecological group. Troglophile (Nentwig et al. 2025).

Family Pholcidae C. L. Koch, 1850

Genus *Holocnemus* Simon, 1875

18. *Holocnemus pluchei* (Scopoli, 1763)

Distribution in the study area. Dolabistavi Cave (Deltshev et al. 2023) .

Ecological group. Troglaxene (Barjadze et al. 2019).

Family Pisauridae Simon, 1890

Genus *Pisaura* Simon, 1885

19. *Pisaura mirabilis* (Clerck, 1757)

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Odishi plain, Racha. (Barjadze et al. 2015a, 2015b).

Ecological group. Accidental record (A. Seropian personal communication).

Family Theridiidae Sundevall, 1833

Genus *Phylloneta* Archer, 1950

20. *Phylloneta impressa* (L. Koch, 1881)

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2019).

Ecological group. Accidental record (A. Seropian personal communication).

Genus *Theridion* Walckenaer, 1805

21. *Theridion melanurum* Hahn, 1831

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2019).

Ecological group. Accidental record (A. Seropian personal communication).

Order Mesostigmata G. Canestrini 1891

Family Veigaiaidae Oudemans, 1939

Genus *Veigaia* Oudemans, 1905

22. *Veigaia planicola* (Berlese, 1892)

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Not defined.

Order Opiliones Sundevall, 1833

Family Nemastomatidae Simon, 1872

Genus *Nemaspela* Šilhavý, 1966

23. *Nemaspela femorecurvata* Martens, 2006

Distribution in the study area. Sakishore Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Gumista-Psirtskha, Racha (Modebadze et al. 2023).

Ecological group. Troglobiont (Modebadze et al. 2023).

Family Phalangiidae Latreille, 1802

Genus *Rilaena* Šilhavý, 1965

24. *Rilaena zakatalica* Snegovaya & Chemeris, 2005

Distribution in the study area. Usholta Cave (Barjadze et al. 2019).

Ecological group. Accidental record (own observation).

Order Sarcoptiformes Reuter, 1909

Family Achipteriidae Thor, 1929

Genus *Parachipteria* Hammen, 1952

25. *Parachipteria fanzagoi* (Jacot, 1929)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Autognetidae Grandjean, 1960

Genus *Autogneta* Hull, 1916

26. *Autogneta longilamellata* (Michael, 1885)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Genus *Conchogneta* Grandjean, 1963

27. *Conchogneta dalecarlica* (Forsslund, 1947)

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Okriba, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).



Figures 2–7. **2:** Live specimen of *Dina kobakhidzei* Grosser, Maghradze & Barjadze, 2025 from Tskhrajvari I Cave; **3:** Live specimen of *Inotrechus usholtaensis* Maghradze, Lohaj & Faille, 2025 from Usholta Cave; **4:** Live specimen of *Acanthophorella didi* Antić, Margalitadze & Šević, 2025 from Sakinule Cave; **5:** Live specimen of *Neobisium verae* (Lapschoff, 1940) from Sakinule Cave; **6:** Live specimen of *Plutomurus weinerae* Barjadze, Kováč & Parimuchová, 2024 from Usholta Cave; **7:** Live specimen of *Xiphocaridinella lechkhumensis* Marin & Barjadze, 2022 from Verdzistava II Cave (Photo credit: Dragan Antić).

Family Ceratozetidae Jacot, 1925

Genus Ceratozetes Berlese, 1908

28. Ceratozetes gracilis (Michael, 1884)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Genus *Sphaerozetes* Berlese, 1885

29. *Sphaerozetes tricuspidatus* Willmann, 1923

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Askhi, Gaucha, Okriba, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Chamobatidae Grandjean, 1954

Genus *Chamobates* Hull, 1916

30. *Chamobates cuspidatus* (Michael, 1884)

Distribution in the study area. Kidobana and Tsakhi caves (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

31. *Chamobates voigtsi* (Oudemans, 1902)

Distribution in the study area. Kidobana, Tsakhi and Shareula I caves (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Askhi, Okriba, Racha, Zemo Imereti massifs (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Damaeidae Berlese, 1896

Genus *Epidamaeus* Koch, 1835

32. *Epidamaeus pinguis* (Kulijev, 1967)

Distribution in the study area. Kidobana and Shareula I caves (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Genus *Metabelba* Grandjean, 1936

33. *Metabelba flagelliseta* Bulanova-Zachvatkina, 1965

Distribution in the study area. Kidobana Cave (Murvanidze 2014).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Galumnidae Jacot, 1925

Genus *Pilogalumna* Grandjean, 1956

34. *Pilogalumna tenuiclava* (Berlese, 1914)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Liacaridae Sellnick, 1928

Genus *Dorycranosus* Woolley, 1969

35. *Dorycranosus splendens* (Coggi, 1898)

Distribution in the study area. Sakinule Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Liebstadiidae Balogh & P. Balogh, 1984

Genus *Liebstadia* Oudemans, 1906

36. *Liebstadia similis* (Michael, 1888)

Distribution in the study area. Melia Cave (Barjadze et al. 2015a).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Microzetidae Grandjean, 1936

Genus *Miracarus* Kunst, 1959

37. *Miracarus hurkai* Kunst, 1959

Distribution in the study area. Tsivtskala I Cave (Barjadze et al. 2019).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Mycobatidae Grandjean, 1954

Genus *Minunthozetes* Hull, 1916

38. *Minunthozetes pseudofusiger* (Schweizer, 1922)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Gaucha, Okriba, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Oppiidae Grandjean, 1951

Genus *Graptoppia* Balogh, 1983

39. *Graptoppia foveolata* (Paoli, 1908)

Distribution in the study area. Melia Cave (Barjadze et al. 2015a).

Distribution in the Georgian Karst massifs. Racha, Sataplia-Tskaltubo (Barjadze et al. 2015a).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Oribatulidae Thor, 1929

Genus *Phauloppia* Berlese, 1908

40. *Phauloppia lucorum* (C.L.Koch, 1841)

Distribution in the study area. Sakinule Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Okriba, Racha (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Genus *Zygoribatula* Berlese, 1896

41. *Zygoribatula frisiae* (Oudemans, 1900)

Distribution in the study area. Kidobana and Sakinule Caves (Murvanidze 2014).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Phenopelopides Petrunkevitch, 1955

Genus *Eupelops* Ewing, 1917

42. *Eupelops acromios* (Hermann, 1804)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Okriba, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

43. *Eupelops torulosus* (Koch, 1839)

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Zetorchestidae Michael, 1898

Genus *Zetorchestes* Berlese, 1888

44. *Zetorchestes falzonii* Coggi, 1898

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Tectocepheidae Grandjean, 1954

Genus *Tectocepheus* Berlese, 1896

45. *Tectocepheus velatus velatus* (Michael, 1880)

Distribution in the study area. Kakhidze and Tsivtskala I caves (Murvanidze 2014).

Distribution in the Georgian Karst massifs. Askhi, Okriba, Racha, Zemo Imereti plateau (Murvanidze 2014).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Zetomotrichidae Grandjean, 1954

Genus *Ghilarovus* Krivolutsky, 1966

46. *Ghilarovus kvavadzei* Murvanidze, 2014

Distribution in the study area. Tsakhi Cave (Murvanidze 2014).

Distribution in the Georgian Karst massifs. Okriba, Racha (Murvanidze 2014).
Ecological group. Troglophile (Turbanov et al. 2016b).

Order Pseudoscorpionida de Geer, 1778

Family Chthoniidae Daday, 1889

Genus *Globochthonius* Finnegan, 1932

47. *Globochthonius satapliaensis* (Schawaller & Dashdamirov, 1988)

Material examined. GEORGIA • 1♂; western Georgia, Tsageri municipality, Verdzistava II cave; 23 Jul 2022; leg. E Kiria, L Shavadze. • 2♂; western Georgia, Ambrolauri municipality, Tsakhi Cave; 7 Apr 2024; leg. A Margalitadze, M Gogshelidze.

Distribution in the Study Area. Tsakhi and Verdzistava II caves.

Distribution in the Georgian Karst massifs. Khvamli, Racha, Sataplia-Tskaltubo (Zaragoza et al. 2021).

Ecological group. Troglobiont (Zaragoza et al. 2021).

Family Neobisiidae Chamberlin, 1930

Genus *Neobisium* Chamberlin, 1930

48. *Neobisium sakishorensense* Novák & Gogshelidze, 2025

Distribution in the study area. Sakishore Cave (Novák and Gogshelidze 2025); endemic to RKM.

Ecological group. Troglobiont (Novák and Gogshelidze 2025).

49. *Neobisium verae* (Lapschoff, 1940)

Distribution in the study area. Melia and Tsakhi caves (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Racha (Fig. 5), Sataplia-Tskaltubo (Barjadze et al. 2015a, 2015b).

Ecological group. Troglobiont (Turbanov et al. 2016b).

Class Collembola Lubbock 1870

Order Entomobryomorpha Börner 1913

Family Entomobryidae Folsom, 1937

Genus *Pseudosinella* Schäffer, 1897

50. *Pseudosinella alba* (Packard, 1873)

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglaxene (own observation).

51. *Pseudosinella octopunctata* Börner, 1901

Distribution in the study area. Kakhidze Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglaxene (own observation).

Family Isotomidae Schäffer, 1896

Genus *Folsomia* Willem, 1902

52. *Folsomia candida* Willem, 1902

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Chaama, Gumista-Psirtskha, Odishi plain, Sataplia-Tskaltubo, Unknown karst massif in Samegrelo, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

53. *Folsomia inoculata* J. Stach, 1946

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

54. *Folsomia spinosa* Kseneman, 1936

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Genus *Lepidocyrtus* C. Bourlet, 1839

55. *Lepidocyrtus lignorum* (Fabricius, 1793)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Askhi, Okriba, Odishi plain, Racha (Barjadze et al. 2015a, 2015b).

Ecological group. Troglaxene (own observation).

Family Neanuridae Börner, 1901

Genus *Neanura* A.D. MacGillivray, 1893

56. *Neanura muscorum* (Templeton, 1835)

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Tomoceridae Schäffer, 1896

Genus *Tomocerus* H. Nicolet, 1842

57. *Tomocerus vulgaris* (Tullberg, 1871)

Distribution in the study area. Kidobana Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Odishi plain, Racha, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b).

Ecological group. Possibly a troglophile (Turbanov et al. 2016b).

Genus *Plutomurus* R.Yosii, 1956

58. *Plutomurus birsteini* Djanashvili & Barjadze, 2011

Material examined. GEORGIA • 2♂; western Georgia, Ambrolauri municipality, Nikortsminda Sakinule Cave; 1 May 2023, leg. E Maghradze. • 1♂; western

Georgia, Oni municipality, Kvedi II Cave; 24 May 2023, leg. M Gogshelidze. • 2♀; western Georgia, Ambrolauri municipality, Mghvime Gzis Piras (a cave by the roadside near the Shaori Reservoir); 22 Jun 2023; leg. L Shavadze. • 2♂; western Georgia, Tkibuli municipality, Tskhrajvari I Cave; 8 Oct 2023; leg. M Gogshelidze.

Distribution in the study area. Mghvime Gzis Piras, Kvedi II, Melia, Sakinule, Sakishore, Shareula II, Tsakhi, Tskhrajvari I and Tvishi caves (Barjadze et al. 2015a, 2015b; present study).

Distribution in the Georgian Karst massifs. Okriba, Khvamli, Racha, Sataplia-Tskaltubo, Zemo Imereti plateau (Barjadze et al. 2015a, 2015b; present study).

Ecological group. Troglophile (own observation).

59. *Plutomurus weinerae* Barjadze, Kováč & Parimuchová, 2024

Distribution in the study area. Usholta Cave (Barjadze et al. 2024) (Fig. 6); endemic to RKM.

Ecological group. Troglophile (Barjadze et al. 2019).

Order Poduromorpha Börner 1913

Family Hypogastruridae Börner 1906

Genus *Ceratophysella* Börner, 1932

60. *Ceratophysella cavicola* (Börner, 1901)

Distribution in the study area. Melia Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Chaama, Racha (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile with some troglomorphic features (Turbanov et al. 2016 b).

Order Symphypleona Börner, 1901

Family Arrhopalitidae Stach, 1956

Genus *Pygmarrhopalites* Vargovitsh, 2009

61. *Pygmarrhopalites principalis* (Stach, 1945)

Distribution in the study area. Melia and Tsakhi Caves (Barjadze and Djanashvili 2008).

Distribution in the Georgian Karst massifs. Okriba, Racha, Sataplia-Tskaltubo, Zemo Imereti plateau (Barjadze et al. 2015a).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Onychiuridae Lubbock, 1867

Genus *Argonychiurus* Bagnall, 1949

62. *Argonychiurus multiocellatus* Djanashvili, Barjadze, Jordana & Burkhardt, 2014

Distribution in the study area. Tvishi Cave (Djanashvili et al. 2014); endemic to KKM.

Ecological group. Troglobiont (Djanashvili et al. 2014).

Class Chilopoda Latreille, 1816

Order Lithobiomorpha Pocock, 1895

Family Lithobiidae Pocock, 1895

Genus *Harpolithobius* Verhoeff, 1904

63. *Harpolithobius perplexus* Zaleskaja, 1972

Material examined. GEORGIA • 2♀; western Georgia, Ambrolauri municipality, Sakavria Cave; 26 Aug 2024; leg. E Maghradze.

Distribution in the study area. Sakavria Cave.

Distribution in the Georgian Karst massifs. Racha (Kiria et al. 2023).

Ecological group. Troglophile (Turbanov et al. 2016b).

64. *Harpolithobius spinipes* Folkmanová, 1958

Material examined. GEORGIA • 1♂; western Georgia, Ambrolauri municipality, Gzispiras Cave; 3 May 2023; leg. M Gogshelidze, L Shavadze.

Distribution in the study area. Mghvime Gzis Piras.

Ecological group. Not defined.

Genus *Lithobius* Leach, 1814

65. *Lithobius coloratus* Sseliwanoff, 1881

Distribution in the study area. Tsivtskala II Cave (Kiria et al. 2023).

Ecological group. Troglophile (Turbanov et al. 2016b).

66. *Lithobius erythrocephalus* Koch, 1847

Distribution in the study area. Tsivtskala II Cave (Kiria et al. 2023).

Ecological group. Troglophile (Turbanov et al. 2016b).

67. *Lithobius reconditus* Zaleskaja, 1972

Distribution in the study area. Dolabistavi and Sakishore Cave (Kiria et al. 2023).

Distribution in the Georgian Karst massifs. Gumista-Psirtska, Sataplia-Tskaltubo, Racha, Zemo Imereti plateau (Kiria et al. 2023).

Ecological group. Troglophile (Turbanov et al. 2016b).

68. *Lithobius viriatus* Sseliwanoff, 1880

Material examined. GEORGIA • 1♀; western Georgia, Oni Municipality, Kvedi II Cave; 2 May 2023; leg. M Gogshelidze, L Shavadze.

Distribution in the study area. Kvedi II Cave.

Ecological group. Not defined.

Order Scutigeromorpha Pocock, 1895

Family Scutigeridae Leach, 1814

Genus *Scutigera* Lamarck, 1801

69. *Scutigera coleoptrata* (Linnaeus, 1758)

Material examined. GEORGIA • 1♀; western Georgia, Tsageri Municipality, Tvisshi V Cave; 8 April 2024; leg. M Gogshelidze, L Shavadze, A Margalitadze.

Distribution in the study area. Tvishi V Cave.

Distribution in the Georgian Karst massifs. Arabika (Kiria et al. 2023), Khvamli.

Ecological group. Troglophile (Turbanov et al. 2016b).

Order Chordeumatida Pocock, 1894

Family Anthroleucosomatidae Verhoeff, 1899

Genus *Acanthophorella* Antić & Makarov, 2016

70. *Acanthophorella barjadzei* Antić & Makarov, 2016

Distribution in the study area. Dolabistavi Cave (Antić & Makarov 2016; Antić et al. 2025); endmeic to RKM.

Ecological group. Troglobiont (Antić & Makarov 2016).

71. *Acanthophorella didi* Antić, Margalitadze & Šević, 2025

Material examined. GEORGIA • many; western Georgia, Oni Municipality, Sakavria Cave; 26 Aug 2024; leg. L Mumladze, E Maghradze, Sh Barjadze. 3 Nov 2024; leg: N Modebadze, A. Margalitadze. • 3♂, 3♀; western Georgia, Ambrolauri municipality, Racha 2001; 26 Aug 2024; leg. L Mumladze, E Maghradze, Sh Barjadze. • 2♂, 4♀; western Georgia, Ambrolauri municipality, Tskradjvari II (kveda) Cave; 25 Aug 2024; leg. E Maghradze, Sh Barjadze.

Distribution in the study area. Muradi, Nikortsminda, Sakinule (Fig. 4), Tskhrajvari I (all from Antić et al. 2025), Racha 2001, Sakavria, and Tskrajvari II Caves; endemic to RKM.

Ecological group. Troglobiont (Antić et al. 2025).

72. *Acanthophorella gaumarjos* Antić, Margalitadze & Šević, 2025

Material examined. GEORGIA • 2♂, 1♀; western Georgia, Ambrolauri municipality, Sakavria Cave; 26 Aug 2024 leg. L Mumladze, E Maghradze, Sh Barjadze.

Distribution in the study area. Mghvime Gzis Piras, Sakavria (Antić et al. 2025); endmeic to RKM.

Ecological group. Troglobiont (Antić et al. 2025).

73. *Acanthophorella valerii* Antić, in Antić et al., 2023

Distribution in the study area. Usholta Cave (Antić et al. 2023); endemic to RKM.

Ecological group. Troglobiont (Antić et al. 2023).

Genus *Georgiosoma* Antić & Makarov, 2016

74. *Georgiosoma bicornutum* Antić & Makarov, 2016

Distribution in the study area. Lagernaia I Cave (Antić and Makarov 2016); endemic to KKM.

Ecological group. Troglobiont (Antić and Makarov 2016).

Genus *Ratcheuma* Golovatch, 1985

75. *Ratcheuma exorne* Golovatch, 1985

Distribution in the study area. Melia Cave (Golovatch 1985); endmeic to RKM.

Ecological group. Troglobiont (Golovatch 1985).

Order Glomerida Brandt, 1833

Family Glomeridae Leach, 1816

Genus *Trachysphaera* Heller, 1858

76. *Trachysphaera minuta* Golovatch, 1976

Distribution in the study area. Shareula I Cave (Golovatch 1990).

Ecological group. Troglophile (Turbanov et al. 2016b).

77. *Trachysphaera orientalis* Golovatch, 1976

Distribution in the study area. Tsakhi Cave (Golovatch, 1990).

Distribution in the Georgian Karst massifs. Racha, Zemo Imereti plateau (Golovatch, 1990; Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Order Julida Brandt, J. F. (1833)

Family Julidae Leach, W. E. (1814)

Genus *Chaetoleptophyllum* Verhoeff, 1898

78. *Chaetoleptophyllum flexum* Golovatch, 1979

Material examined. GEORGIA • 4♂, 1♀; western Georgia, Ambrolauri Municipality, Kidobana Cave; 3 Nov 2018; leg. G Nebieridze.

Ecological group. Troglaxene (Evsyukov et al. 2020).

Genus *Cylindroiulus* Verhoeff, 1894

79. *Cylindroiulus schestoperovi* Lohmander, 1932

Distribution in the study area. Sakinule Cave (Read 1992).

Ecological group. Troglaxene (Read 1992).

Genus *Leucogeorgia* Verhoeff, 1930

80. *Leucogeorgia* aff. *lobata* Antić & Reip, 2020

Material examined. GEORGIA • 1♂, 4♀, 4 juv.; western Georgia, Tsageri Municipality, Verdzistava II Cave; 4 Nov 2021; leg: E Magradze, Sh Barjadze.

Distribution in the study area. Ekis (Antić and Reip 2020) and Verdzistava II Caves; endemic to RKM, KKM.

Ecological group. Troglobiont (Antić and Reip 2020).

81. *Leucogeorgia gioi* Antić & Reip, 2020

Material examined. GEORGIA • 1♂, 1♀, 1 juv.; western Georgia, Ambrolauri municipality, Melia Cave; 1 Mar 2024; leg. M Gogshelidze, E Kiria, N Modebadze, L Shavadze and A Margalitadze.

Distribution in the study area. Melia Cave.

Distribution in the Georgian Karst massifs. Zemo Imereti plateau (Antić and Reip 2020) and Racha.

Ecological group. Troglobiont (Antić and Reip 2020).

82. *Leucogeorgia golovatchi* Antić & Reip, 2020

Distribution in the study area. Tsakhi Cave (Antić and Reip 2020); endemic to RKM.

Ecological group. Troglobiont (Antić and Reip 2020).

83. *Leucogeorgia longipes* Verhoeff, 1930

Distribution in the study area. Dolabistavi, Sakishore and Tskhrajvari I caves (Antić and Reip 2020; Antic et al. 2025).

Distribution in the Georgian Karst massifs. Okriba, Racha, Zemo Imereti plateau (Antić and Reip 2020; Antić et al. 2025).

Ecological group. Troglobiont (Antić and Reip 2020).

Order Polydesmida Pocock, 1887

Family Polydesmidae Leach, 1816

Genus *Brachydesmus* Heller, 1858

84. *Brachydesmus kalischewskyi* Lignau, 1915

Material Examined. GEORGIA • 1♂, 4♀; western Georgia, Ambrolauri municipality, Kidobana Cave; 3 Nov 2018; leg. G Nebieridze. • 1♂; western Georgia, Tsageri municipality, Tvishi V Cave; 17 May 2018; leg. G Nebieridze.

Distribution in the study area. Kidobana, Melia, Sakinule and Tvishi V caves (Golovatch et al. 2016; present study).

Distribution in the Georgian Karst massifs. Kudaro, Racha (Golovatch et al. 2016; Turbanov et al. 2016b) and Khvamli.

Ecological group. Troglaxene (Golovatch et al. 2016).

Genus *Polydesmus* Latreille, 1802

85. *Polydesmus abchasius* Attems, 1898

Distribution in the study area. Sakinule Cave (Golovatch et al. 2016).

Distribution in the Georgian Karst massifs. Gumista-Psirtskha, Racha (Golovatch et al. 2016).

Ecological group. Troglaxene (Golovatch et al. 2016).

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Family Formicidae Latreille, 1809

Genus *Lasius* Fabricius, 1804

86. *Lasius fuliginosus* Latreille, 1798

Distribution in the study area. Usholta Cave (Barjadze et al. 2019).

Ecological group. Not defined.

Order Lepidoptera Linnaeus, 1758

Family Geometridae Leach, 1815

Genus *Triphosa* Stephens, 1829

87. *Triphosa dubitata* (Linnaeus, 1758)

Distribution in the study area. Dolabistavi, Sakishore and Usholta caves (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Family Noctuidae Latreille, 1809

Genus *Scoliopteryx* Germar, 1810

88. *Scoliopteryx libatrix* (Linnaeus, 1758)

Distribution in the study area. Dolabistavi and Sakishore caves (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Order Coleoptera Linnaeus, 1758

Family Carabidae Latreille, 1802

Genus *Duvalius* Delarouzée, 1859

89. *Duvalius gregoi* Maghradze, Barjadze, Lohaj & Faille, 2025

Distribution in the study area. Kvedi II Cave (Maghradze et al. 2025), endemic to RKM.

Ecological group. Troglobiont (Maghradze et al. 2025).

Genus *Inotrechus* Dolzhanski & Ljovushkin, 1989

90. *Inotrechusinjaevae* Dolzhanskij et Ljovuschkin, 1989

Distribution in the study area. Sakishore Cave (Barjadze et al. 2015a, 2015b); endemic to RKM.

Ecological group. Troglobiont (Barjadze et al. 2019).

91. *Inotrechus usholtaensis* Maghradze, Lohaj & Faille, 2025

Distribution in the study area. Usholta Cave (Maghradze et al. 2025); endemic to RKM (Fig. 3).

Ecological group. Troglobiont (Maghradze et al. 2025).

Genus *Laemostenus* Bonelli, 1810

92. *Laemostenus ljevushkini* Vereschagina, 1985

Distribution in the study area. Usholta Cave (Barjadze et al. 2019).

Distribution in the Georgian Karst massifs. Okriba, Racha, Sataplia-Tskaltubo (Barjadze et al. 2019).

Ecological group. Not defined.

Genus *Troglocimmerites* Ljovuschkin, 1970

93. *Troglocimmerites djanaschvilii* Ljovuschkin, 1970

Distribution in the study area. Melia Cave (Barjadze et al. 2019).

Ecological group. Troglobiont (Barjadze et al. 2019).

Family Staphylinidae Latreille, 1802

Genus *Bryaxis* Kugelann, 1794

94. *Bryaxis hypocritus* Plavilshchikov, 1940

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Ecological group. Probably Troglophile (Turbanov et al. 2016).

Order Orthoptera Latreille, 1793

Family Rhaphidophoridae Walker, 1869

Genus *Dolichopoda* Bolívar, 1880

95. *Dolichopoda euxina* Semenov, 1901

Distribution in the study area. Tsakhi (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Arabika, Bach-Otkhara, Chaama, Duripshi plateau, Fanavi, Gumishta-Psirtska, Okriba, Racha, Sataphlia-Tskaltubo, Tsebelda, Unknown Cave in Gudauta Municipality (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016b).

Class Malacostraca Latreille, 1802

Order Amphipoda Latreille, 1816

Family Niphargidae Bousfield, 1977

Genus *Niphargus* Schiödte, 1849

96. *Niphargus rachalechkhumensis* Marin, Barjadze, Maghradze & Palatov, 2023

Distribution in the study area. Dolabistavi, Sakishore, and Verdzistava II caves (Marin et al. 2023); endemic to RKM, KKM.

Ecological group. Stygobiont (Marin et al. 2023).

97. *Niphargus tvishiensis* Marin, Barjadze, Maghradze & Palatov, 2023

Distribution in the study area. Verdzistava I Cave (Marin et al. 2023); endemic to KKM.

Ecological group. Stygobiont (Marin et al. 2023).

Order Decapoda Latreille, 1802

Family Atyidae De Haan, 1849

Genus *Xiphocaridinella* Sadowsky, 1930

98. *Xiphocaridinella lechkhumensis* Marin & Barjadze, 2022

Distribution in the study area. Verdzistava II Cave (Marin and Barjadze 2022) (Fig. 7); endmeic to KKM.

Ecological group. Stygobiont (Marin and Barjadze 2022).

Order Isopoda Latreille, 1816

Family Ligiidae Leach W.E. 1814

Genus *Caucasoligidium* Borutzky, 1950

99. *Caucasoligidium cavernicola* Borutzky, 1950

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Arabika, Chaama, Gumish-ta-Psirtskha, Tsebelda, Racha, Unknown karst massif in Gudauta Municipality (Barjadze et al. 2015a, 2015b).

Ecological group. Troglophile (Turbanov et al. 2016a).

Family Trichoniscidae G. O. Sars, 1899

Genus *Colchidoniscus* Borutzky, 1974

100. *Colchidoniscus kutaissianus* Borutzky, 1974

Material examined. GEORGIA • 4♂, 2♀; western Georgia, Tsageri municipality, Verdzistava II Cave; 4 Nov 2021; leg. Sh Barjadze, M Gogshelidze, N Modebadze, E Maghradze.

Distribution in the study area. Verdzistava II Cave.

Distribution in the Georgian Karst massifs. Askhi, Sataplia-Tskaltubo (Barjadze et al. 2015b) and Khvamli.

Ecological group. Troglobiont (Turbanov et al. 2016a).

Class Copepoda H. Milne-Edwards, 1840

Order Harpacticoida G. O. Sars, 1903

Family Canthocamptidae G. O. Sars, 1906

Genus *Bryocamptus* Chappuis, 1929

101. *Bryocamptus birsteini* Borutzky, 1940

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b); endemic to RKM.

Ecological group. Stygobiont (Turbanov et. al 2016a).

102. *Bryocamptus innominatus* Borutzky, 1940

Distribution in the study area. Tsakhi Cave (Barjadze et al. 2015a, 2015b).

Distribution in the Georgian Karst massifs. Fanavi, Racha, Sataplia-Tskaltubo (Barjadze et al. 2015a, 2015b).

Ecological group. Stygobiont (Barjadze et al. 2019).

Additional material examined. There are 12 species that differ from other species observed in the study area, that are not listed above: *Caucasogeyeria*

sp.1 from Verdzistava I and Verdzistava II caves; *Nemaspela* sp. 1 from Melia and Sakavria caves and *Nemaspela* sp. 2 from Sakavria Cave; *Plutomurus* sp. 1 from Tvishi II Cave, *Plutomurus* sp. 2 from Verdzistava II Cave and *Plutomurus* sp. 3 from caves of Khvamli I, Khvamli II, and Khvamli III; *Caucasoligidium* sp. 1 from Khvamli III; *Caucasoligidium* sp. 2 from Khvamli I, Khvamli II and Sakavria caves; *Ligidium* sp. 6 from Tekenteri Chasm; *Ligidium* sp. 7 from Kvedi II Cave; *Trachelipus* sp. 1 from Chkondidi Cave; *Trichoniscus* sp. 1 from Melia Cave.

Discussion

Here we presented data derived from 30 caves, some of which (Sakavria, Mghvime Gzis Piras, etc.) are not included in the latest cadastre of Georgian caves (Tatashidze et al. 2009) because they were discovered later. Among the five studied caves in the Khvamli massif, the highest species number (five) was recorded in Verdzistava II Cave. In contrast, 25 caves have been surveyed in the Racha massif, where Tsakhi Cave is populated with the highest number of species – 20 in total (Table 1).

According to current data, 102 species have been recorded in the Racha and Khvamli karst caves (instead of previously known 94 species). These species belong to 10 classes, 25 orders, 57 families, and 78 genera. Out of 95 and 11 species recorded in caves of the Racha and Khvamli karst massifs, respectively, only five species are shared, including two local endemics: *Niphargus rachalechkhumensis* and *Leucogeorgia* aff. *lobata*. In total, 20 local endemics are recorded.

Among the studied caves, no invertebrates were reported from Sakavria Cave prior to our study. Thus, the record of two millipede species, *Acanthophorella gaumarjos* and *A. didi* (an example of syntopy), *Harpolithobius perplexus*, and several other unidentified taxa are the first invertebrate records for Sakavria Cave.

The discovery of a few taxa resulted in a significant increase of known distribution ranges for a number of species previously recorded in other areas. For example, *Globochthonius satapliaensis*, known from the caves of the Sataplia-Tskaltubo karst massif, is now recorded in both studied massifs. *Harpolithobius perplexus* was earlier reported from unnamed caves near Sokhumi, but it has now been found in the Sakavria Cave in the Racha karst massif, which represents another significant range extension. It is worth to note that two species, *Harpolithobius spinipes* and *Lithobius viriatus*, have been observed in caves for the first time.

In total, 31 troglobiotic and stygobiotic species have been identified, which represents approximately 30% of the total number of species. In addition, we recorded 45 troglophiles, two stygobionts, 13 troglloxenes, six accidental records, and five species without ecological status due to insufficient material of these taxa. Troglobionts are represented predominantly by nine millipede species, and stygobionts by four mollusc species. Two species occur in both regions: the troglobiont *Globochthonius satapliaensis* and the stygobiont *Niphargus rachalechkhumensis*. Many caves in the studied massifs still remain biologically unexplored, which hinders an in-depth understanding of the species distribution and community composition in the subterranean environments of

the Racha and Khvamli karst massifs. Moreover, several recorded taxa differ from all other known species from the nearby areas. So, the number of taxa is expected to increase provided further research, with the potential to describe a number species new to science.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

AM wrote the original draft of the manuscript and created the map. EK, MG, LS, NM, and SB edited the draft and identified the specimens of Chilopoda, Pseudoscorpiones, Isopoda, Opiliones, and Collembola, respectively.

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Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

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